

PATENT APPLICATION OF

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for

TITLE: REVOLUTIONARY CONNECTIONS FOR SPARK PLUGS  
AND SPARK PLUG WIRES

Form SB/08A---Information disclosure statement by applicant is  
attached hereto, disclosing relevant prior-art references.

FEDERALLY SPONSORED RESEARCH

Not Applicable

SEQUENCE LISTING OR PROGRAM

Not Applicable

BACKGROUND OF THE INVENTION

This invention relates to secondary ignition system for internal combustion engines, specifically to an improved positive locking function and easy removal for conventional spark plugs and spark plug:wires connections.

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Variety of connections have been used in spark plugs and plug wires couplings, the most popular style is click-in, push to connect and pull to disconnect. Push to connect will create confusion sometimes whether said connections are secured or just being snug? Bench test reveals free spinning of components from said connections even though they are tight and secured. Self-separation occurs occasionally due to aging, repeated services, thermal cycles, vibration and high voltage conduction. If said self-separation should happen, it will cause pollution, poor performance and possibly internal engine damage. Pull to disconnect is another negative factor, when pulling is exercised, there is tendency of tearing components apart, rubber boot being torn possibly damaging the core in the plug wire, misfire would happen. In addition to surrounding high temperature, confined space, service personnel always have to face frustration, struggle or even minor bodily injuries in the field of servicing said connections. Numerous prior arts offered remedies, particularly U.S.PAT.no.(5,332,394), Frost Jul., 1994 and U.S.PAT.no.(4,810,198), Sturdevan Mar., 1989. Since all connections are couplers, concentrating upon one end will not reach ultimacy, the essence of my invention is synchronizing the other end which is the spark plug tip, an all-time solution.

#### SUMMARY

The invention will bring maintenance, services and repairs to a new boundary by providing simple, effortless procedure for servicing spark plugs and plug wires connections. The positive locking feature ensures an EPA issue-nonmisfiring, the self-pop-up released feature is a phenomenon to all related service personnel.

#### DRAWINGS

##### Drawing figures

Fig 1 shows conventional spark plug.

Fig 2 shows new configuration of spark plug tip.

Fig 3 shows top view of trust washer with inside diameter  $\pm 6\text{mm}$ , outside diameter  $\pm 9\text{mm}$ , due to various spark plug tip design, inside diameter should be recalibrated to fit individual application.

Fig 4 shows compressible spring with free height  $\pm 14\text{mm}$ , outside diameter  $\pm 9\text{mm}$ .

Fig 5 shows spark plug tip with built-in slot-pins  $\pm 9\text{mm}$  in length.

Fig 5A shows top view of spark plug tip with built-in slot-pins.

Fig 6 shows new configuration of spark plug tip after assembly.

Fig 7 shows conventional plug wire with stationary rubber boot.

Fig 7A shows built-in metal clip 14, rubber boot not shown.

Figs 8-8A show front and rear views of new embodiment with predetermined slots and omission of metal clip 14.

Fig 8B shows top view of Figs 8 and 8A.

Fig 9 shows adaptor for modified spark plug tip and conventional spark plug wire, an alternative embodiment.

Fig 10 shows new configuration after assembly, a preferred embodiment.

Fig 11 shows adaptor for modified spark plug tip and conventional spark plug wire metal clamp, an alternative embodiment.

#### REFERENCE NUMERALS IN DRAWINGS

10	built-in slot-pins	12	thrust washer
14	metal clip	16	metal clamp
18	rubber boot	20	plug wire (partial)
22	built-in slots	24	adaptor

#### DETAILED DESCRIPTION

##### Preferred embodiment

Drill a predetermined hole through upper portion of a conventional spark plug tip, install compressible spring over plug tip, put thrust washer on top of said spring, insert a predetermined slot-pin or cotter-pin through the hole to hold said washer and spring in place. The said assemblage can also be put together with built-in slot-pins in manufacturing process of spark plugs.

The spring clip in conventional plug wire metal clamp will be omitted, predetermined slots are built in metal clamp, recommend

material for modified metal clamps be superior than existing counterpart. Rubber boot will be made to slide along plug wire instead of stationary, same modification can be applied to Hemi style long-reached plug wire and Distributorless individual ignition coil design.

#### Alternative embodiment

An adaptor can be built with conventional plug tip at one end, which will fit conventional plug wire metal clamp, while the other end with predetermined slots will fit in spring-loaded plug tip. The advantage here is no modification needed for conventional plug wires, but non locking character still exists.

#### OPERATION

The invention provides simple steps to connect and disconnect spark plug wires from spark plugs. For removal, slide rubber boot 18(Fig 7) upward to expose enough metal clamp of plug wire 20(Fig 8) press said metal clamp down, turn counter clockwise to release, since plug tip is spring-loaded, said metal clamp will be pushed out after it clears the slot-pins. Compare to what mechanics are doing these days like twisting, pulling and yanking, this self-pop-up is a phenomenon. For installation, hold said metal clamp against matching slot-pins ( can be felt easily ),once metal clamp clears said slot-pins, press down and turn clockwise to lock, the spring will urge upon said metal clamp, forming a positive locking position, slide down said rubber boot firmly. With conventional snap and pull connections, even experienced mechanic can't be certain said connections are secured or just being snug, now they are black and white!